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Field Service Procedure

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Kit, Low Flow Flowmeters

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KIT, LOW FLOW FLOWMETERS

CONVERSION PROCEDURE

NOTE: The flowmeter tubes are held by compression in gaskets at the top and bottom of each tube. Each upper gasket is seated in an adjustable retainer that allows removal of the tube. Access to the flow tubes and their retainers requires removal of the plexiglass cover on the gas instrumentation panel. A typical flow tube mounting arrangement is shown in Fig. 1.

1. Disconnect all pipeline hoses and turn the System Power switch to ON.

2. Close all cylinder valves except the O_2 valve.

3. Set the oxygen flow to 5 l/min.

4. Open the other gas flow control valves to drain pressure from the system.

5. Close the O_2 cylinder valve, and close the flow control valves. Press the O_2 Flush valve to drain pressure from the system.

6. Turn the System Power switch to STANDBY.

7. For later machines with the plexiglass cover over the gauges and flow tubes, remove the screws holding the table top to the machine and lift out the table top.

8. Early models: Remove the flowmeter housing rear cover.

9.A Early models: Remove the two screws (from the back) holding the front plate at the top of the plexiglass cover. Hold the front plate as the screws are removed from the back.

9.B Later models (without the O_2/N_2O ratio alarm lamp): Remove the six screws holding the flowmeter shield and vapor box cover panel, and remove the panel.

10. For earlier machines where the plexiglass covers only the flow tubes, skip to Step 12.

    For later machines with the plexiglass cover over the gauges and flow tubes, remove the O_2 flow control knob. The knob has two setscrews.

NOTE:

If the knob must be rotated to allow access to a setscrew, carefully note its position so that it can be re-assembled in the same position with the "Off Stop" properly set.

11. Remove the two screws holding the knob guard in place, and remove the knob guard.

CONVERSION PROCEDURE (continued)

12. Remove the screws holding the plexiglass cover, and carefully remove the cover.

13. Loosen the screw directly above the flowmeter tube to be replaced. Turning the screw counter clockwise will raise the upper flow tube retainer. Raise the retainer far enough to be able to pull the top of the tube outward, and remove the tube.

NOTE:
If the bottom of the tube is seated in a flow restrictor, be sure that the arrangement of the restrictor and its gaskets is not disturbed.

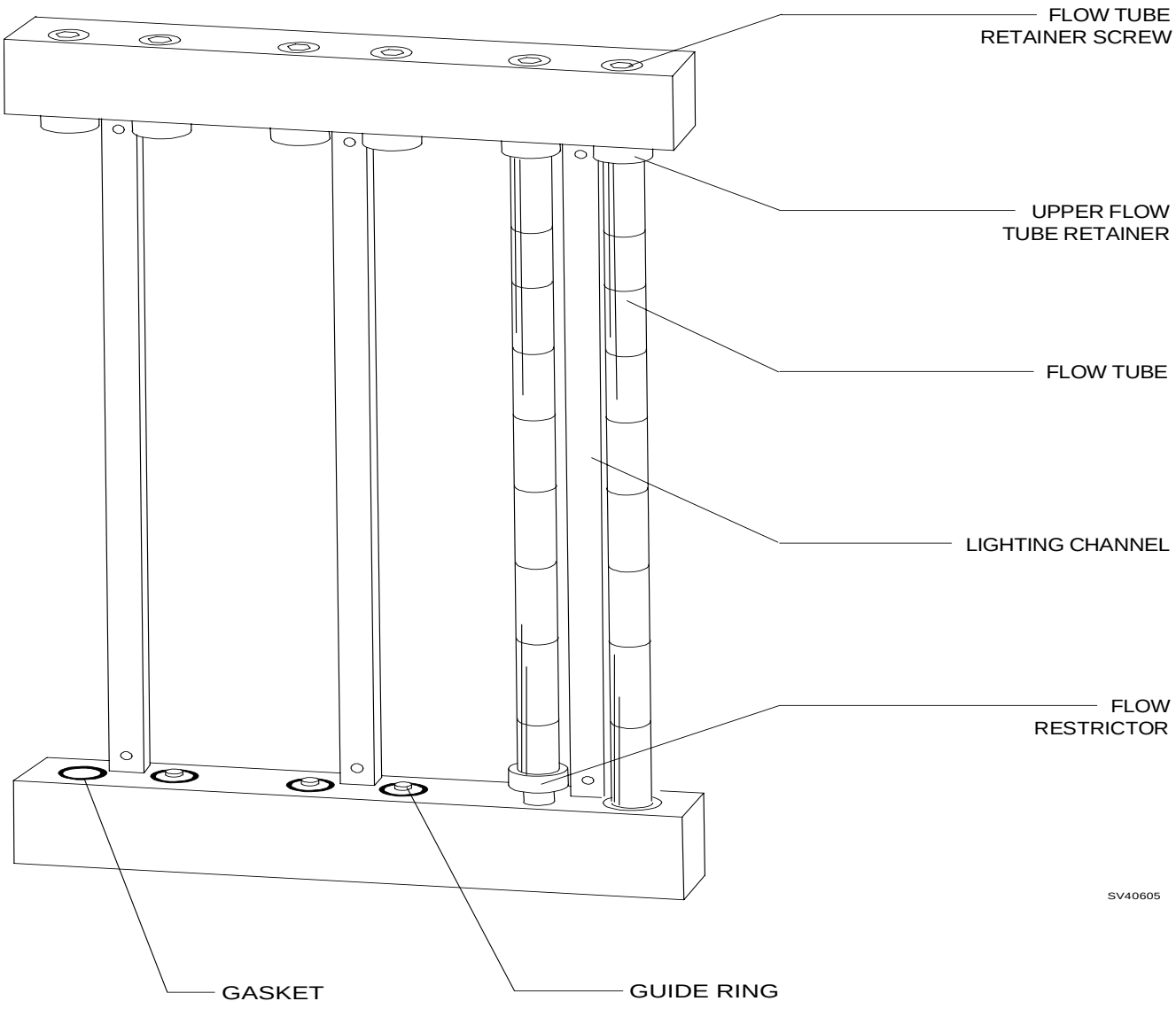

Figure 1: FLOWMETERS

CONVERSION PROCEDURE (continued)

14. Since the replacement flow tubes are labeled but do not have a color designation, attach an appropriate label to the top and bottom of the coarse (0.6 - 10 L/min.) flow tube. Be sure not to cover the flow measurement labeling. The flow tube designated "O2" will have a green O2 label affixed; the flow tube designated "N2O" will have a blue N2O label affixed. Make sure that each flow tube has an indicator ball.

Note: If the replacement N2O "fine" flow tube appears to be too short, use the supplied N2O restrictor housing and gasket to fit the flow tube. Be sure to transfer the original N2O restrictor and bottom O-ring to the new restrictor housing.

15. Place the bottom of the flowmeter tube into the guide ring of the lower gasket seal, and position the top of the flow tube into the center guide ring of the top gasket seal. It will be easier to hold the tube if the adjacent lighting channel is pulled forward and temporarily removed.

CAUTION:
The flowmeter tube must be properly centered over the guide rings or damage to the flowmeter tube may occur.

16. Ensure that the markings on the flow tube are facing forward, and turn the upper retainer screw clockwise until the flow tube is firmly held in place.

CAUTION:
Do not over-tighten the screw as the flowmeter tube may break.

17. Repeat Steps 13 thru 16 for the other three flow tubes.

18. Perform the following leak test on the system:

a. Disconnect the absorber hose from the freshgas outlet.

b. Connect a test gauge and B.P. bulb to the freshgas outlet, and pressurize the system to 50 cm H_2O.

c. The pressure should not drop more than 10 cm H_2O in thirty seconds.

19. Disconnect the test gauge and re-connect the absorber hose to the freshgas outlet.

20. Replace any lighting channels that were previously removed.

21. Set the front plexiglass cover in place, and reinstall the cover screws. Do not over-tighten these screws as the plexiglass may crack.

22. If applicable, reinstall the knob guard.

23. If applicable, reinstall the O_2 flow control knob and tighten its setscrews. If the knob is installed properly, the O_2 label will be straight when the knob is against its clockwise stop.

24. Replace the front cover plate at the top of the plexiglass cover and secure it with the hardware that was previously removed.

25. If applicable, reinstall the flowmeter housing rear cover.

26. If applicable, reinstall the table top and its retaining screws.

27. Connect the pipeline hoses.

28. Perform a complete PMS procedure on the machine.

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